

CPR and the RCP (2)

Training of students and doctors in UK medical schools

ABSTRACT—We asked British medical schools and teaching hospitals about the training they offer to medical students and hospital doctors in cardiopulmonary resuscitation. The response rate was 96%. Training that is practical and consistent with guidelines is offered to nearly all students and house officers, often by consultants. Training for other junior doctors and consultants is much less common. The organisation of training is haphazard, and many hospitals have no resuscitation training officers. As a result, few doctors receive the frequent retraining needed to maintain competence in managing cardiopulmonary arrest.

Seventy per cent of the mortality after cardiac arrest in hospital occurs during the arrest itself [1]. The greatest potential for improving short-term [2] and long-term [1] survival may therefore result from the immediate availability of staff proficient in cardiopulmonary resuscitation (CPR). However, most doctors are incapable of providing adequate resuscitation [3–6]. Many believe themselves to be competent but are shown not to be when tested objectively [7,8]. Training for only a few hours enables doctors and medical students to perform effective CPR [9,10], but their skills decay within a few months [11,12] to the extent that one study found no residual effect on performance at CPR six months after completion of training [13]. Initial over-training (to instructor level) [14] and retraining

[15,16] have been shown to improve retention of skills.

The challenge is to provide adequate training and retraining to medical students and doctors to enable them to resuscitate patients effectively. In 1987, the Royal College of Physicians of London issued guidelines [17] on training for and organisation of CPR. We carried out a postal survey to assess CPR training at British medical schools and teaching hospitals and to assess the impact of the College's guidelines.

Method

We sent a letter to the deans of all British undergraduate medical schools and of the Royal Postgraduate Medical School, asking for the name and address of the individual(s) at that school and its associated teaching hospitals with responsibility for training in CPR. We then sent a questionnaire to the trainers asking about the nature and timing of training provided for medical students and junior doctors; who did the training; whether it was compulsory and whether it was examined. We also asked about their attitudes to various certificates in cardiac and trauma life support [18–20] and whether they had obtained or considered obtaining them. We enquired about the implementation of specific recommendations from the Royal College of Physicians: whether their hospital had a resuscitation committee, its membership; whether there was a resuscitation training officer, and whether retraining in CPR was offered to consultants. Trainers were also asked to describe any innovations they had developed. We sent them reminder letters and questionnaires after six weeks and telephoned trainers who did not reply after three months.

Copies of the questionnaire are available from the authors.

Results

Thirty-seven questionnaires were returned, a response rate of 96%, including at least one from every medical school except Cambridge (which has a policy of not replying to questionnaires on single issues in medical education). From some medical schools we received separate and sometimes contradictory questionnaires from several respondents who were in some cases on different clinical teaching sites. Six respondents stated that they were resuscitation training officers, 23 were doctors, and the rest did not specify.

J H GILLARD, MB

Honorary Research Associate

T H S DENT, MRCP

Honorary Research Associate

B C JOLLY, MA*

Senior Lecturer in Medical Education

D A WALLIS, SRN**

Resuscitation Training Officer

B H HICKS, MD

Postgraduate Dean

Postgraduate Medical Department, United Medical and Dental Schools of Guy's and St Thomas' Hospitals, London

* *Joint Academic Unit for Medical and Dental*

Education, The Medical Colleges of

St Bartholomew's and the Royal London Hospitals

** *Department of Accident and Emergency,*

St Bartholomew's Hospital, London

CPR in the preclinical course

Eighty-two per cent (28/34) of respondents were responsible for training medical students in CPR; in some schools there was confusion as to who was responsible for such training. A respondent in the Midlands replied 'I don't think anyone is officially responsible for CPR training'. In six out of the 26 schools that replied (23%), respondents said that there was no CPR training in the preclinical course although in three cases this was contradicted by another respondent. The topics included in the preclinical training course were basic life support alone in 56% (14/25), and basic life support with the use of airway adjuncts in 44% (11/25).

CPR training in the clinical course

All schools offered this. Table 1 shows the phase(s) of the clinical course during which it was provided.

The median duration of training was three hours (range 1 to 20 hours) of which a median of one hour was spent on theoretical training and a median of two hours on practice with a manikin. Again the range was large: some medical schools use only one of these methods of training and some spend up to 10 hours on each.

Of the 58 trainers (Table 2) 45 (78%) were doctors. Other trainers included resuscitation training officers, reported by 10 respondents, and nurses, preclinical teachers and ambulance officers, reported once each. Training was mostly provided in small groups: the median group size was nine for theoretical training and six for practical training.

The content of the training was fairly uniform. All respondents included basic life support and airway adjuncts in training, all but one included drugs and all but two included defibrillation and published protocols on resuscitation. A large minority (13/31, 42%) trained their students using a simulated cardiac arrest. A school which provided nothing more than training in basic life support with airway adjuncts at any stage

Table 1. Phase(s) of the clinical course when cardiopulmonary resuscitation is provided

Firm or year of clinical course	Number of respondents (%)
Anaesthetics	18 (55)
Accidents and emergency	11 (33)
Cardiology	4 (12)
General medicine	2 (6)
Surgery	1 (3)
Geriatrics	1 (3)
Year 1 (firm unspecified)	6 (18)
Year 2 (firm unspecified)	2 (6)
Year 3 (firm unspecified)	2 (6)

Table 2. Medically qualified cardiopulmonary resuscitation trainers

Specialty	Grade		
	Consultant	Other grade	Not specified
Anaesthetics	9	9	10
Accident and emergency	5	3	3
Cardiology	0	0	3
General medicine	0	2	0
Surgery	1	0	0

of the course reported that training in advanced techniques depended on extra funding. This school has a resuscitation training officer, but the workload in a large hospital may exceed one trainer's capacity. One told us that she was asked to train 1,500 nurses and 130 junior doctors. As a result she had time to train only those medical students who passed through the cardiology firm; the rest received no training in the clinical course.

Most respondents included an examination in their training (21/33, 64%) and 13 of them included a practical test with a manikin. Three respondents mentioned that the students were not permitted to sit finals unless they had passed the CPR examination. One Scottish school used a simulated cardiac arrest in the clinical section of finals to test the nine hours of training provided there for clinical students. Another school always included two multiple choice questions on resuscitation in finals.

CPR training for doctors

Sixty-eight per cent of respondents (23/34) were responsible for training doctors. All but one teaching hospital respondent said that training for doctors was available but, as shown in Table 3, the groups of doctors who were offered training differed greatly.

Table 3. Groups of doctors offered cardiopulmonary resuscitation training

Group of doctors	Number offered training (%)
Medical house officers	25/27 (93)
Surgical house officers	23/27 (85)
Medical senior house officers	10/25 (40)
Anaesthetic senior house officers	8/25 (32)
Accident and emergency senior house officers	16/27 (59)
Accident and emergency registrars	3/26 (12)

The denominators vary because of differing numbers of respondents to each question.

Training was compulsory according to 74% of respondents (23/31). The median interval between a doctor taking up post and receiving training was a week. The median duration of a training period for doctors was two hours. Most of this was spent on practical training (median one hour) rather than theory (median 30 minutes). There were no statistically significant differences between duration of clinical students' and doctors' training. All respondents included basic life support, the use of airway adjuncts and defibrillation, but 31% (9/29) did not train in intubation and 23% (7/31) did not use a simulated cardiac arrest. It came as a surprise that only six of 32 (19%) formally assessed doctors for competence in CPR.

Few consultants were offered resuscitation training (7/27, 26%). They may not be interested in being trained: one hospital in London invited all its consultants for training and only one responded. They may be more enthusiastic if the training is provided sensitively as at a Manchester teaching hospital where the responding consultant trained his colleagues on a 1:1 or 1:2 basis. At another hospital, spouses were invited and the sessions were held in the evening to make attendance easier.

Training certificates

Table 4 shows the attitudes of respondents to various certificates of proficiency in providing and training in life support [18–20], in response to the question 'How useful do you consider it for CPR trainers to obtain the following certificates?' There were no significant differences between doctors and resuscitation training officers in attitudes to these certificates. Eight respondents had not considered obtaining these certificates. The responses of those who had are shown in Table 5.

The Advanced Trauma Life Support certificates are available only to doctors; for the majority of resuscitation training officers, who have a nursing background, an analogous certificate is available at the end of the Advanced Trauma Nursing Course. The Paediatric Advanced Life Support certificate has only recently become available in Britain, with about 30 people certified so far.

The organisation of resuscitation

All 33 respondents who answered this question reported that their hospital had a resuscitation committee. Most members were consultant anaesthetists and nurses (both 23/24, 96%); consultants in cardiology and in accident and emergency (both 16/24, 67%); and junior doctors (15/24, 63%). Only a minority of committees included electrocardiography technicians (9/24, 38%) and pharmacists (7/24, 29%). Interesting innovations reported from some hospitals were the inclusion of managers and porters.

Resuscitation training officers were included in these committees where the post existed, but 11/27

(41%) of teaching hospitals did not have one. This was a frequent source of frustration to respondents in such hospitals. They reported to us that resuscitation training officers had been 'frequently requested but never funded', 'we are actively trying to get funds for one', 'trying hard for one', 'sadly not—continued attempts at raising funds', and 'on shopping list for many years'. This appointment was clearly seen as a vital step in securing adequate training.

We enquired about the activities and frequency of meeting of resuscitation committees but few respondents gave useful replies.

We compared the hospitals and medical schools with and without resuscitation training officers, using Epi-info [21]. The only statistically significant difference was that schools with resuscitation training officers were more than twice as likely to examine clinical students in CPR competence than those without (Fisher's exact test, $p = 0.023$). This relationship may be confounded by the greater commitment to resuscitation training of those institutions that have resuscitation training officers.

Discussion

Preclinical and clinical CPR training

The topics included in preclinical and clinical resuscitation training are appropriate. The diversity of staff involved in training students reflects the number of professional groups with resuscitation skills and the shortage of people able and willing to do the training, especially where there is no resuscitation training officer. Without any single department or specialty being obviously responsible, training depends on the availability and commitment of enthusiasts. The leading role taken by consultants in some institutions is noteworthy.

A third of schools did not examine their students' proficiency in resuscitation. It would be useful if students were required to demonstrate their competence before entering finals, so that house officers at least start their careers with adequate resuscitation skills. Medical students view a part of the course which is effectively examined as more important and approach it with more resolve [22, 23]. Examining clinical students in CPR was more common at schools with a resuscitation training officer.

Respondents found this postal questionnaire more demanding to complete than we expected. Some deans had difficulty naming colleagues responsible for resuscitation training. In some cases, the named individual had responsibility for only part of the course or for training at only one clinical site. Occasionally replies from the same medical school were contradictory. Many respondents went to great pains to gather information about training provided on other sites or in different parts of the course. These efforts were

Table 4. Attitudes of respondents to training certificates

Certificate	Response		
	Very useful	Fairly useful	Useless
<i>Certificate available to medical and non-medical staff:</i>			
Advanced cardiac life support provider	20	5	1
Paediatric advanced life support provider	8	10	2
<i>Certificates available to medical staff only:</i>			
Advanced trauma life support instructor	11	13	2
Advanced trauma life support provider	11	12	2

Table 5. Acquisition of training certificates by respondents

Certificate	Response	
	Considered obtaining	Obtained
<i>Certificates available to medical and non-medical staff:</i>		
Advanced cardiac life support provider	9	8
Paediatric advanced life support provider	5	6
<i>Certificates available to medical staff only:</i>		
Advanced trauma life support instructor	6	6
Advanced trauma life support provider	10	8

greatly appreciated, but they reflect the uncoordinated nature and often autonomous form of much resuscitation training. Many medical schools and hospitals find it difficult to define agreed objectives for training, achieve a coordinated undergraduate and postgraduate resuscitation training programme, or make the most effective use of training resources. **We suggest** that all medical schools and teaching hospitals designate an individual as resuscitation training coordinator to facilitate these activities, even if the resources for a resuscitation training officer are not yet available.

Training for doctors

Preregistration house officers regularly attend cardiac arrests but have limited competence [5] and confidence [24] in CPR, so it is understandable that most hospitals concentrate on training them. However, skills decay without retraining [25] and experience of managing cardiac arrests does not prevent this [9]. The failure to retrain 88% of accident and emergency registrars, the majority of medical and anaesthetic senior house officers, and more than a third of accident and emergency senior house officers is therefore hazardous, however highly trained these doctors may previously have been and whatever their apparent compe-

tence in other areas of clinical care. The lack of skill of these groups is confirmed by a study [26] which showed that out of 30 junior physicians regularly conducting CPR and preparing for the MRCP Part II examination (in which resuscitation skills may be examined), only one avoided fundamental errors in resuscitation.

This lack of training may be partly attributable to the attitudes of the doctors themselves. One resuscitation training officer reported that some doctors were 'very resistant to attending training sessions' and a consultant anaesthetist wrote that 'house officers have proved very difficult to reach'. Resuscitation training was compulsory for some junior doctors in three quarters of hospitals, but this only applied to house officers in many cases. A hospital in Manchester included this in an induction course on 31 July, the day before house officers took up their posts, because otherwise they were 'too busy to attend'. **We recommend** extending compulsory retraining to all doctors who regularly resuscitate patients. Only a fifth of training sessions for doctors include a formal examination, but practical training with an electronic manikin usually continues until the trainee has achieved a satisfactory proportion of effective chest compressions and ventilations.

The areas of resuscitation training covered in sessions for doctors are appropriate and the emphasis on practical training is welcome. Training in endotracheal intubation is important, but it can be argued that other aspects of CPR such as defibrillation for ventricular fibrillation are more urgent tasks at a cardiac arrest; in most hospitals an anaesthetist soon arrives to intubate the patient anyway. The inexperienced sometimes have difficulty recognising when they have intubated the oesophagus [27], and it can be argued that a medical student or any doctor who does not intubate regularly, should not be expected to perform this function.

The Royal College of Physicians guidelines

Our questionnaire assessed the impact of some of the guidelines published by the Royal College of Physicians of London in 1987 [17]. The recommendations that basic life support should be taught to preclinical students and that basic life support, the use of airway adjuncts and defibrillation should be taught to clinical medical students are generally heeded; but another recommendation, that all hospital medical staff should be taught basic life support and defibrillation, was only sketchily obeyed. Even doctors who are regularly involved in resuscitating patients are not usually retrained and tested in these skills. Testing resuscitation skills in qualifying examinations is exceptional rather than the norm as recommended by the College.

The College advocated that every member of the resuscitation team should be regularly trained in endotracheal intubation using a manikin. A large minority of schools do not observe this even with respect to doctors. Other areas of training the College favoured, such as the use of drugs and knowledge of Resuscitation Council protocols, are now universal practice.

The College urged that 'a resuscitation training officer should be appointed by every district health authority or other equivalent body'. We are aware of only 45 full-time resuscitation training officers in Britain, and more than a third of the hospitals that replied to our survey did not have one at all.

Every hospital that responded to our questionnaire has a resuscitation committee as recommended, although this may be less common outside teaching units. The composition of the committees reflects the College's recommendations, although the absence of junior doctors from some committees is surprising, considering this group's leading role in actually carrying out CPR.

The College suggested that 'consultants in clinical medical specialties should be capable of giving basic life support with airway adjuncts and defibrillation: regular revision and retraining should be offered'. Few hospitals in our survey did this, and those that did found that few consultants attended. Most consultants seldom attend an arrest, but when they do they may be expected to lead the resuscitation team. Participation

by leaders is an accepted part of effective quality improvement programmes in health care [28].

Conclusions

Cardiopulmonary resuscitation training is a routine part of undergraduate and postgraduate medical education in Britain. Its content, emphasis on practical skills and penetration into training for students and house officers are satisfactory. However, training is generally uncoordinated and the lack of adequate numbers of resuscitation training officers means that too few postregistration doctors are trained and retrained. It is most important to keep in mind the clear research finding that resuscitation skills fade fast and need frequent reinforcement by retraining. It is therefore a matter of concern that training programmes to maintain doctors' proficiency have not been universally implemented.

Acknowledgements

We are grateful to the resuscitation trainers who responded readily and informatively to our enquiry.

This project was funded by South East Thames Regional Health Authority's Locally Organised Research Scheme.

References

- 1 Tunstall-Pedoe H, Bailey L, Chamberlain DA, Marsden AK, *et al.* Survey of 3765 cardiopulmonary resuscitations in British hospitals (the BRESUS study): methods and overall results. *Br Med J* 1992;**304**:1347-51.
- 2 Lowenstein SR, Sabyan EM, Lassen CF, Kern DC. Benefits of training physicians in advanced cardiac life support. *Chest* 1986;**89**:512-6.
- 3 Casey WF. Cardiopulmonary resuscitation: a survey of standards among junior hospital doctors. *J R Soc Med* 1984;**77**:921-4.
- 4 Lunn ME, Galletly DC. Resuscitation skills of first year postgraduate doctors. *New Zealand Med J* 1989;**102**:409-11.
- 5 Morris F, Tordoff SG, Wallis D, Skinner DV. Cardiopulmonary resuscitation skills of pre-registration house officers: five years on. *Br Med J* 1991;**302**:626-7.
- 6 Goodwin APL. Cardiopulmonary resuscitation skills (letter). *Br Med J* 1991;**302**:1081-2.
- 7 Lowenstein SR, Libby LS, Mountain RD, *et al.* Cardiopulmonary resuscitation skills by medical and surgical house officers. *Lancet* 1981;**ii**:679-81.
- 8 Skinner DV, Camm AJ, Miles S. Cardiopulmonary resuscitation skills of pre-registration officers. *Br Med J* 1985;**290**:1549-50.
- 9 Kaye W, Wynne G, Marteau T, Dubin HG, *et al.* An advanced resuscitation course for pre-registration house officers. *J R Coll Physicians Lond* 1990;**24**:51-4.
- 10 Thwaites BC, Shankar S, Niblett D, Saunders J. Can consultants resuscitate? *J R Coll Physicians Lond* 1992;**26**:265-7.
- 11 Mancini ME, Kaye W. The effect of time since training on house officers' retention of cardiopulmonary resuscitation skills. *Am J Emerg Med* 1985;**1**:31-2.
- 12 Fossel M, Kiskaddon RT, Sternbach GL. Retention of cardiopulmonary resuscitation skills by medical students. *J Med Educ* 1983;**23**:184-91.
- 13 Curry L, Gass D. Effects of training in cardiopulmonary resuscitation on competence and patient outcome. *Can Med Assoc J* 1987;**137**:491-6.

- 14 Tweed WA, Wilson E, Isfeld B. Retention of cardiopulmonary resuscitation skills after initial overtraining. *Crit Care Med* 1980;8:651-3.
- 15 Weaver P, Ramirez AG, Dorfman SB, Raizner AE. Trainees' retention of cardiopulmonary resuscitation: how quickly they forget. *J Am Med Assoc* 1979;241:901-3.
- 16 Mandel LP, Cobb LA. Initial and long-term competency of citizens trained in cardiopulmonary resuscitation. *Emerg Health Serv Q* 1982;1:49-63.
- 17 Report of the Royal College of Physicians. *Resuscitation from cardiopulmonary arrest: training and organisation*. London: RCP, 1987.
- 18 American Heart Association. *Textbook of advanced cardiac life support*. Dallas: American Heart Association, 1987.
- 19 American College of Surgeons. *Advanced trauma life support program*. Chicago: American College of Surgeons, 1989.
- 20 American Heart Association and American Academy of Pediatrics. *Textbook of pediatric advanced life support*. Dallas: American Heart Association, 1990.
- 21 Dean AD, Dean JA, Burton JH, Dicker RC. *Epi info version 5: a word processing, database and statistics program for epidemiology on microcomputers*. Atlanta: Centers for Disease Control, 1990.
- 22 Newble DI, Jaeger K. The effect of assessments and examinations on the learning of medical students. *Med Educ* 1983;17:165-71.
- 23 Jolly BC, Newble DI, Chinner T. The learning effect of re-using stations in an objective structured clinical examination. *Teaching and Learning Med* 1993;5:66-71.
- 24 Dent THS, Gillard JH, Aarons EJ, Crimlisk HL, Smyth-Pigott PJ. Pre-registration house officers in the four Thames regions: a survey of education and workload in teaching and non-teaching hospitals. *Br Med J* 1990;300:713-8.
- 25 Moser DK, Coleman S. Recommendations for improving cardiopulmonary resuscitation skills retention. *Heart Lung* 1992;21:372-80.
- 26 David J, Prior-Willeard PFS. Resuscitation skills of MRCP candidates. *Br Med J* 1993;306:1578-9.
- 27 O'Flaherty D, Adams AP. Endotracheal intubation skills of medical students. *J R Soc Med* 1992;85:603-4.
- 28 Donabedian A. Institutional and professional responsibilities in quality assurance. *Quality Assurance in Health Care* 1989;1:3-11.

Address for correspondence: Dr T H S Dent, Department of Public Health Medicine, Cambridge Health Authority, Fulbourn Hospital, Cambridge CB1 5EF.

Books Published by The Royal College of Physicians

UK Customers please add £1.00 for postage and packing.

		Price
1993	Violence in Society Edited by Pamela J Taylor	£14.99 (UK) or £17.99 Overseas
1993	Training to be a Physician	£6.00 (UK) or £9.00 Overseas
1993	Measurement of Patients' Satisfaction with their Care Edited by Ray Fitzpatrick and Anthony Hopkins	£9.00 (UK) or £12.00 Overseas
1993	Access to Health Care for People from Black and Ethnic Minorities Edited by Anthony Hopkins and Veena Bahl	£12.00 (UK) or £15.00 Overseas
1993	Rationing of Health Care in Medicine Edited by Michael Tunbridge	£10.00 (UK) or £12.00 Overseas
1993	Referrals to Medical Outpatients Different agendas of patients, general practitioners and hospital physicians Edited by Anthony Hopkins and Paul Wallace	£10.00 (UK) or £12.00 Overseas
1992	Accidents and Emergencies in Childhood Papers based on a conference held at the Royal College of Physicians Edited by Jo Sibert	£14.95 (UK) or £17.95 Overseas
1992	Measures of the Quality of Life: and the uses to which such measures may be put Edited by Anthony Hopkins	£9.50 (UK) or £12.50 Overseas
1992	Health Systems and Public Health Medicine in the European Community Edited by Mark McCarthy and Sian Rees (A joint publication of the Faculty of Public Health Medicine of the Royal Colleges of Physicians of the UK and the Royal College of Physicians of London)	£11.00 (UK) or £13.00 Overseas
1992	Medical Symptoms not Explained by Organic Disease Edited by Francis Creed, Richard Mayou and Anthony Hopkins (A joint publication of the Royal College of Physicians and the Royal College of Psychiatrists)	£7.50 (UK) and Overseas
1992	Current Themes in Diabetes Care Edited by Ian G Lewin and Carol A Seymour (Papers based on the Interfaces in Medicine Conference organised by the Royal College of Physicians)	£7.00 (UK) or £11.00 Overseas
1991	Pharmaceutical Medicine and the Law—legal responsibility—product liability—Europe (Based on a conference of the Royal College of Physicians of London and the Faculty of Pharmaceutical Medicine of the Royal Colleges of Physicians of the UK)	£23.00 (UK) or £27.50 Overseas
1991	The National Concept of Rehabilitation Medicine (Proceedings of a conference of the Disablement Services Authority and the Royal College of Physicians)	£6.00 (UK) or £7.50 Overseas